



**PTC-960L**



**User's Guide**

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# PTC-960L

## User's Guide





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## User's Guide

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# Regulations 1

## FCC statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

## DOC statement

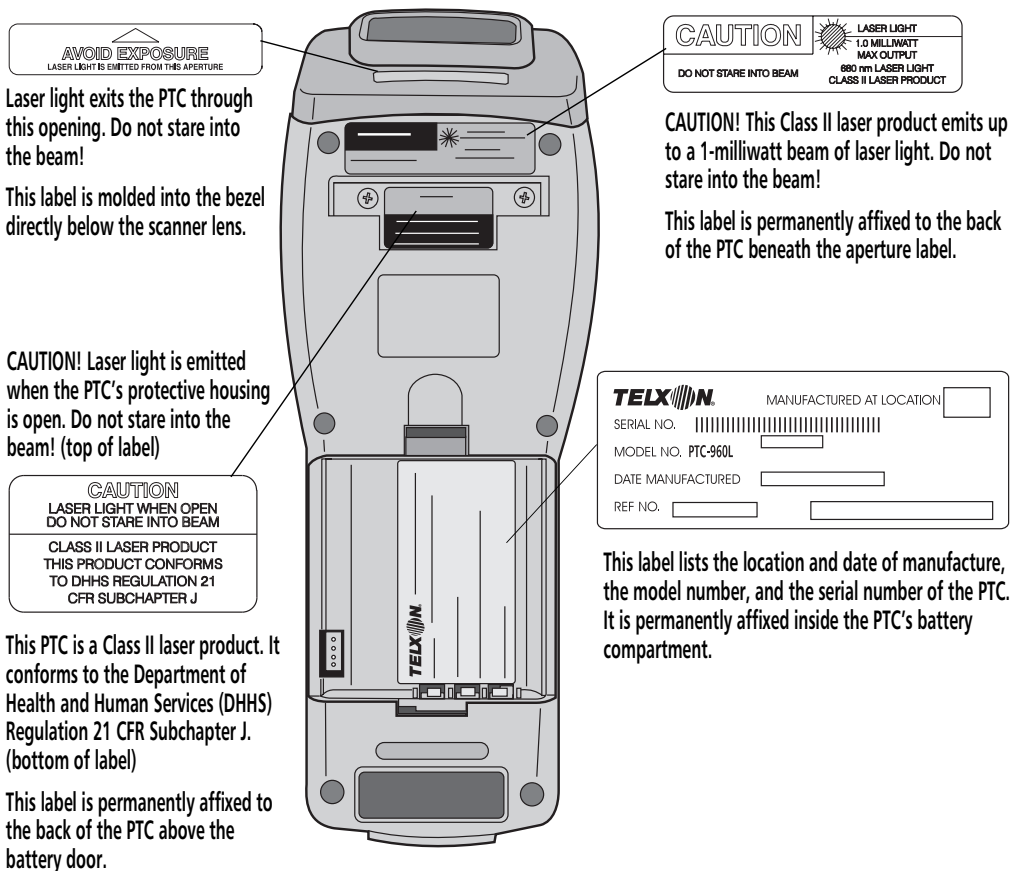
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as outlined in the Radio Interference Regulations of the Canadian Department of Communications (DOC).

This Class A digital apparatus meets all requirements of the Canadian Interference-causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## Safety information 2

### Using the internal short-range laser scanner



## Disposing of nickel-cadmium batteries

Nickel-cadmium batteries contain chemically active materials that are hazardous to the environment; therefore, they must be disposed of properly. Never attempt to incinerate a nickel-cadmium battery; doing so could cause it to explode. Telxon urges you to contact the Environmental Protection Agency, the Department of Natural Resources, a local hazardous waste disposal agency, or the Telxon Customer Support Center for assistance prior to disposing of your nickel-cadmium batteries.

# Scope of the manual 3

This manual provides general information on the PTC-960L's parts, features, and accessories. It also explains how to operate and maintain the PTC.

This manual does not include the specific operating instructions for your organization's unique data collection program. Operating instructions and training should be available from your organization.

## Document conventions

The following conventions are used throughout this manual.

### Warnings

Warnings indicate potential bodily injury or death. They are set off in the left-hand columns of this manual by the following symbol: ⚠.

### Cautions

Cautions indicate potential damage to equipment. They are set off in the left-hand columns of this manual by the following symbol: !.

### Notes

Notes provide supplementary information. They are set off in the left-hand columns of this manual and are not preceded by a symbol.

# Overview of the PTC-960L 4

The Telxon PTC-960L is a compact, battery-powered, hand-held computer used to collect, store, and transmit data. It has a built-in laser scanner that is angled at approximately 20° to allow you to view the display for prompts while scanning.

The PTC-960L automates your data collection procedures and is custom programmed to efficiently handle your organization's unique data collection applications.

The PTC runs an application program specially designed to collect data for your organization. This program leads you through the application with a series of display messages, prompts, and beeps. Messages tell you when you make an error and provide information on the application or the PTC's status. Prompts and beeps tell you when to enter data, what type of data to enter, and when you complete certain operations.

## Entering data

Entering data into the PTC-960L is easy. You can key in data through the keyboard or scan bar codes with the internal laser scanner.

### Through the keyboard

Entering data through the keyboard is similar to operating a calculator. When you press a key on the PTC's keyboard, the corresponding number or letter appears on the display. Pressing the ENTER key stores the data in the PTC's memory.

A *bar code* is a series of vertical bars and spaces used on nearly every item in business today.

### With the internal laser scanner

A second method of entering data is with the PTC's internal laser scanner. When you scan a bar code the PTC is programmed to read, the PTC and scanner interpret the data and store it in the PTC's memory.

## Storing data

Data entered into the PTC can be stored in files in the PTC's memory.

Each file holds a separate group of application-related data. For example, a PTC used to collect many types of data (sales orders, inventory changes, and employee hours) would store all data relating to sales orders in one file, all data relating to inventory changes in another, and all data relating to employee hours in still another.

## Communicating data

After collecting the data, the PTC must either transmit it to a host computer for processing or send it to a printer, or both, to make it useful to you and your organization. The PTC-960L can transmit data via an optional communication cradle or by being connected by cable to a host computer, printer, or other accessory.

Once the host computer receives the data from the PTC, it uses that data to update its master files and records. In some cases, the host computer may even transmit data back to the PTC, asking you, as the PTC's operator, to perform a new task.

# Getting started 5

## Unpacking the PTC-960L

Any additional accessories are shipped separately.

Each shipping box contains

- a PTC-960L with a handstrap,
- a nickel-cadmium battery pack or a 9-volt alkaline battery,
- a battery charger (if ordered),
- a *Guide to Maintaining NiCd Batteries*,
- a *PTC-960L Read-Me-First Sheet*, and
- a *PTC-960L User's Guide*.

1. Remove the PTC from the box.
2. Remove all packing material from the PTC. Save the packaging in case the PTC is ever stored or shipped to Telxon for service.
3. Check the contents of the package to make sure you have received everything ordered.
4. Check the PTC and accessories for shipping damage. Pay particular attention to the PTC case, display screen, and scanner lens.

If anything is missing or damaged, notify your Telxon sales representative.

## Installing the battery

If your PTC was not shipped with the nickel-cadmium battery pack or 9-volt alkaline battery installed, follow the instructions in **Chapter 11** to insert the battery.

! If you are using a 9-volt alkaline battery in your PTC-960L, replace the old battery with a new battery whenever you receive a low-battery warning. You cannot charge alkaline batteries.

The pack can also be charged via a communication cradle or a fast battery charger. Contact your Telxon representative for information.

To charge the battery pack outside of the U.S. or Canada, you need a charger designed for a 220-volt AC outlet.

## Charging the battery pack

Charge the PTC-960L's nickel-cadmium battery pack when you first receive the unit and whenever the pack becomes weak. The Low Battery icon appears on the ninth line of the display when the battery is running out of power.

Use the following procedure to charge the PTC's nickel-cadmium battery pack via a battery charger.

### **Equipment required:**

- A battery charger
- An electrical outlet within 6 feet (1.8 meters) providing 110 volts AC in the U.S. or Canada

1. Make sure the PTC is off.
2. Disconnect any accessories from the PTC.
3. Connect the battery charger's cable to the PTC's micro DB-15 connector.
4. Plug the battery charger into the electrical outlet. The PTC's Charging LED glows.
5. Charge the battery pack for 12 hours.
6. When charging is finished, disconnect the charger from the PTC and the outlet.

## Turning on the PTC-960L

1. Press the ON/OFF key to turn on the PTC-960L.



## Checking the PTC-960L

1. Make sure the PTC is turned on.
2. Look at the PTC's display screen. What appears on the screen depends on the program your organization uses.

If the PTC is operating correctly, you should not see or hear any of the following:

- A low-battery warning
- A blank display screen
- Any warning beeps

Repeat the steps in this chapter if your PTC-960L is not operating properly. If the problem persists, refer to the “Troubleshooting” section on [page 33](#).

# Parts 6

Figures 1 through 3 on the following pages show and describe the external parts of the PTC-960L. The part listed below is internal and, therefore, is not shown in any of the figures.

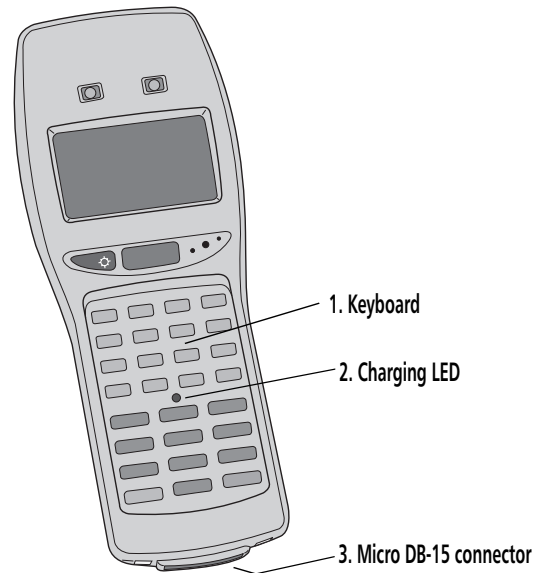
## Flash EPROM

A *flash EPROM* is an electronic component installed inside the PTC. It contains the PTC's data collection program and determines the PTC's key functions, the display prompts and messages, and how and when the PTC prints or transmits data.

For details on erasing and reprogramming flash EPROMS, refer to the *Guide to the Flash Utilities (TCAL or MS-DOS Version)*.

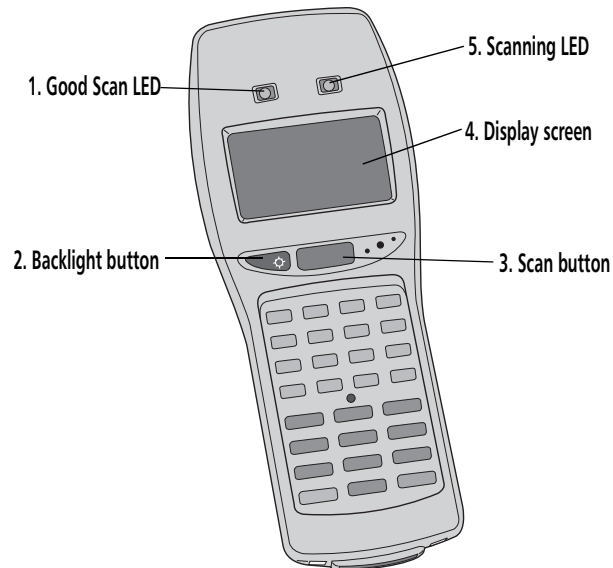
The flash EPROM can be erased and reprogrammed while it is inside the PTC. First, the PTC must be connected to a host computer, via a cable or by being placed in a communication cradle. Then, using software in the PTC's operating system, you can erase the flash EPROM and reprogram it with a new program from the host computer.

Figure 1. The PTC-960L (front view)



1. The PTC-960L's keyboard can be used to enter data into the PTC and to perform special functions, such as turning the unit on or off.
2. This LED glows when the PTC's nickel-cadmium battery pack is being recharged.
3. This 15-pin connector connects the PTC via cable to a host computer or to standard serial devices such as printers and modems. It can also be used with a battery charger to recharge the PTC's nickel-cadmium battery pack.

Figure 2. The PTC-960L (front view)

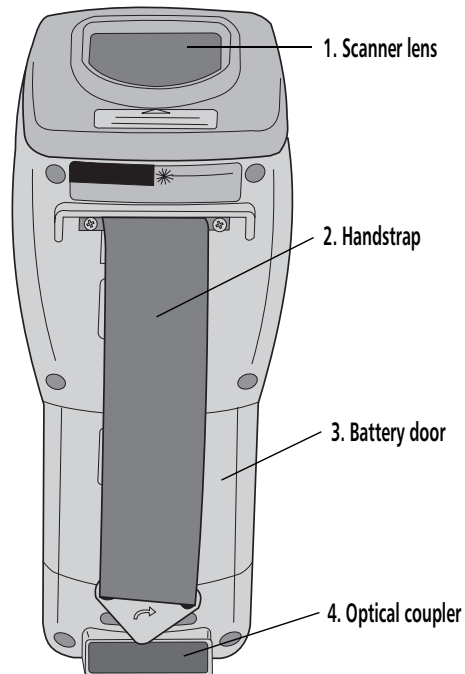



1. This green LED glows when the laser scanner has successfully read a bar code. You may also hear a beep after a successful scan.
2. The Backlight button turns the screen's backlight on or off. It can also be used to control screen contrast. See [page 22](#) for instructions.
3. Pressing this button activates the PTC's internal laser scanner, allowing you to scan bar codes.
4. The liquid crystal display (LCD) screen displays the information you type or scan into the PTC as well as messages from the PTC or host computer. The screen can show 8 lines with 21 characters each. Your screen may also be able to display graphics. An additional line at the bottom of the display is reserved for status indicator icons. These icons are as follows:

Shift Mode Enabled	Caps Lock Enabled	Func1 Is Activated	Func2 Is Activated	RF Out of Range	Low Battery
↑	A↓	F	<b>F</b>	⏏	⚡

5. This red LED glows when the PTC's Scan button has been pressed and the scanner starts to scan a bar code.

Figure 3. The PTC-960L (back view)



1. The laser light emitted from the PTC's internal laser scanner exits the unit through this lens.  
 Do not stare into the laser beam or point the scanner at anyone's eyes; permanent eye damage could result.
2. The handstrap allows you to hold the PTC securely during operation. The handstrap must be removed to replace the PTC's battery. To remove the handstrap, turn the triangle approximately 45° clockwise and release it.
3. The battery door, located under the handstrap, must be removed to replace the battery.
4. The optical coupler allows the PTC to communicate with a host computer through an optional optical communication cradle. Instead of sending data in the form of electronic signals through the micro DB-15 connector, the PTC sends the data in the form of pulses of light to a similar coupler on the cradle. Then the cradle converts the pulses of light into electronic signals and transmits them to the host computer. The cradle can also send data to the PTC via the optical coupler. Refer to the *SC-960RL/SC-960L User's Guide* for instructions on using the cradle.

# Features 7

See [Appendix B](#) for a list of bar-code types your PTC can be programmed to read.

## Autodiscrimination between bar codes

Your PTC-960L's application program can read and automatically discriminate between up to ten different bar-code types. See the information provided by your supervisor for the bar-code types your PTC has been programmed to recognize.

## Automatic off

To conserve battery power, the PTC-960L automatically turns itself off after approximately 1 minute of inactivity. The exact length of time depends on your application program.

## Automatic return at on

When you turn off the PTC-960L (or when the PTC turns itself off), it remembers where it was in the application. Then, when you turn the PTC back on, it returns to that same point in the application. You do not need to review what you have done or perform any other start-up function to find your place.

## Backlight

The screen's backlight lights up the screen and makes information on the display readable in dark or dim conditions. Pressing the Backlight button turns the backlight on or off.

**! Do not store a PTC-960L for over two months without charging the nickel-cadmium battery pack or replacing the alkaline battery. Any data or programs loaded into the PTC's memory will be lost.**

## Backup battery

The PTC-960L's built-in backup battery provides enough power to protect data stored in the PTC's memory when the battery is being replaced or if it runs out of power. The backup battery system provides approximately 20 minutes of protection when the main battery is removed.

## Beeper

The PTC's beeper is used by the PTC and your application program to warn you of problems or to prompt you to take an action. For example, if your application program has temporarily turned off a key, the PTC will beep if you press that key.

Depending on your organization's application software, you may be able to control the beeper's volume. See the manual or information provided by your organization.

## Clock

The PTC-960L has a built-in clock that keeps track of the date (month, day, year, and day of the week) and the time (hours, minutes, seconds, and tenths of seconds). The clock operates continuously. How the clock is used depends on your application program. For example, the PTC-960L can use the clock to show the date and time on its screen or to direct a printer to place a time stamp on a report.

## Communication

The PTC-960L is capable of communicating with a host computer through an optional communication cradle or by being connected directly with a cable. See the manual or instructions provided by your organization for the proper communication procedure for your application.

## Display contrast

You can increase or decrease the display contrast in steps by performing one of the following procedures. In DOS, press the FUNC key and then the Backlight button. In TCAL, start at the system prompt and press the Down Arrow key and then the Backlight button.

## Memory

The PTC-960L's internal memory is used to store your organization's application program and the data you type or scan into the PTC.

Refer to [Appendix A](#) for memory specifications.

The amount of memory in your PTC determines how much data you can type in before you have to send it to a host computer or print it. Various amounts of memory are available from Telxon, and the amount actually installed in your PTC has been determined by your organization's needs.



# Communicating data 8

The PTC-960L is able to communicate with other PTCs, host computers, and external accessories such as printers. It can both send and receive data and instructions. Communication is controlled by your organization's application program. See the manual or instructions provided by your organization for details on conducting communication sessions.

The PTC-960L can communicate by being connected directly to the host computer by cable or by being placed in an optional communication cradle that is connected to the host computer through an optical communication link. Accessories such as printers are connected to the PTC with a cable.

## Using the micro DB-15 connector

Making a direct connection between the PTC-960L and another computer or accessory requires a cable with a micro DB-15 connector on one end and a standard RS-232 signal interface on the other. The cable must be ordered separately. See the cables listed in [Appendix C](#).

### Connecting a cable

1. Make sure you have the correct cable for the device to which you are connecting. If you use the wrong cable, the PTC may not be able to communicate.
2. Turn off the PTC and the computer or accessory to which you are connecting.

! Do not force any connectors together if they do not connect easily; you could damage them.

3. Gently slip the cable's micro DB-15 connector into the PTC's micro DB-15 connector.
4. Connect the other end of the cable to the computer or accessory. Make sure the connectors line up correctly.
5. Turn on the PTC and then turn on the device it is connected to.
6. Follow the instructions for your application program to communicate.

### Disconnecting a cable

Always disconnect connectors by pulling them directly away from each other. Do not pull at an angle or use a rocking or twisting motion.

! Pull on the cable connector's head when disconnecting. Pulling on the cable can break the internal wires.

1. Turn off the PTC.
2. Turn off the device the PTC is connected to.
3. Grasp the cable connector head and remove it from the PTC's micro DB-15 connector.
4. If necessary, disconnect the other end of the cable from the computer or accessory.

### Connecting to the optional communication cradle


See the manual provided with the SC-960L Single-bay Communication Cradle for instructions on how to connect the PTC-960L to the cradle.

# Scanning bar-code labels 9

The PTC-960L can be programmed to automatically recognize, read, and discriminate between up to ten bar-code types.

The bar-code types your PTC-960L can read depend on your PTC's application program. See the information provided by your organization and **Appendix B** for a list of bar-code types the PTC can be programmed to read.

Follow this procedure to scan bar-code labels with the PTC-960L's built-in laser scanner.

 Do not stare into the laser beam or point the scanner at anyone's eyes. Eye damage could result.

See the information provided by your organization for the recommended scanning distance.

1. Point the PTC-960L at the label to be scanned. Hold the PTC at approximately a 20° angle to the label (see **Figure 4**).

The maximum distance from the scanner lens to the label depends on the size of the label being scanned.

2. Press the PTC's Scan button to start scanning. The red Scanning LED glows.

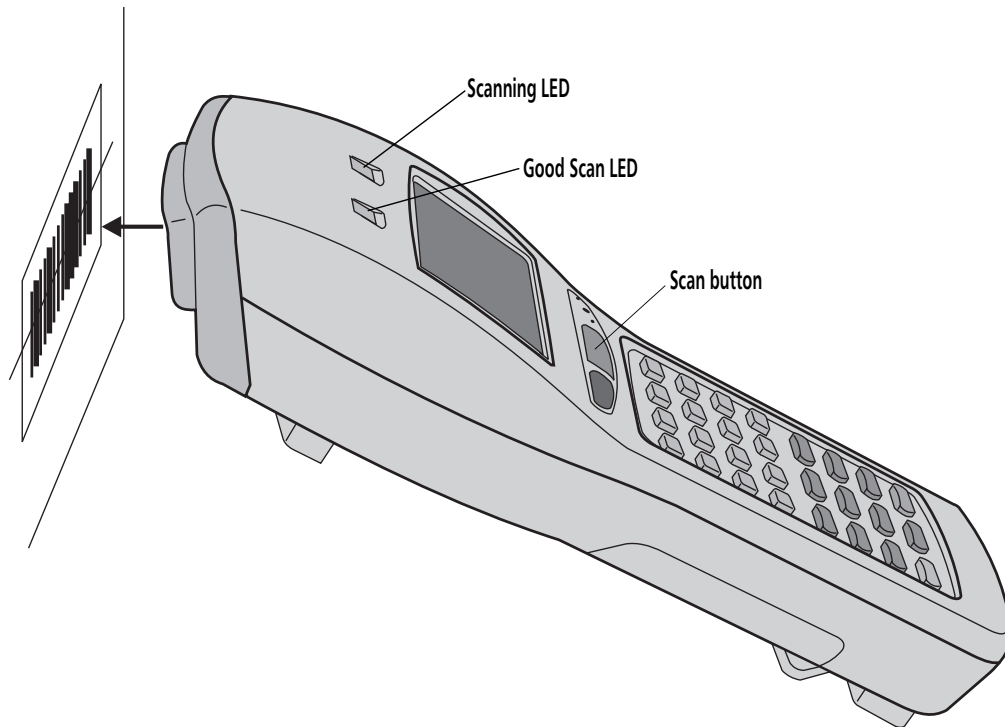
If your PTC is equipped with the aiming dot or marker beam option, the laser projects a red aiming dot. Quickly center the aiming dot over the bar code while pressing the Scan button, and the laser will scan the bar code.

3. Watch the line of light made by the scanner as it scans the bar code. The line must pass over all of the bars on the label for the bar code to be read. See **Figure 4**.

If the scan is not successful, move closer to the bar-code label and try to scan the label again.

If the scan is successful, the green Good Scan LED glows, and the PTC beeps.

Figure 4. Scanning bar-code labels



# Maintaining the PTC-960L 10

## Operating conditions

The PTC-960L is designed to operate in environments that are normally free of dust, dirt, and moisture. It can be operated at temperatures between 0 degrees F (-18 degrees C) and 120 degrees F (49 degrees C).

## Handling the PTC-960L

The following information will help to ensure you receive safe, reliable, and trouble-free service from your PTC-960L.

- Do not stare into the laser beam.
- Do not point the scanner at anyone's eyes. You could cause permanent eye damage.
- Do not open the PTC's case. Only a trained technician can service the parts inside the PTC.
- If you store the PTC-960L in below-freezing temperatures for more than 1 hour, do not charge the nickel-cadmium battery pack until it warms up to room temperature. Charging a cold battery pack can damage it.
- Make sure the PTC is off before you connect or remove any cables or accessories or replace the battery.
- Make sure all accessories connected by cable are connected correctly and the correct cables are used.
- Use only Telxon-approved batteries and accessories. Do not attempt to connect any electrical device that is not part of your PTC-960L system to the PTC.

- Protect the PTC from excessive heat, cold, moisture, and harsh, dirty environments.
- Do not insert anything other than Telxon-approved cables into the PTC's micro DB-15 connector.

## Storing the PTC-960L

- Do not store the PTC-960L in temperatures below -20 degrees F (-29 degrees C) or above 140 degrees F (60 degrees C).
  - Do not store the PTC-960L in a damp or humid environment.
1. Transfer any data stored in the PTC to a host computer or another PTC or print the data. See the manual or instructions for your organization's application program for directions.
  2. Make sure you have a copy of any programs stored in the PTC.
  3. Disconnect all accessories from the PTC.
  4. Recharge the PTC's nickel-cadmium battery pack or replace the alkaline battery.
  5. Pack the PTC in the original packing material or in a padded box and put it in a safe place, away from dust, dirt, humidity, and excessive cold.

## Cleaning the PTC-960L

! Be careful not to scratch the scanner lens when you clean it. Scratches can reduce the scanner's effectiveness.

! Do not soak the cloth and do not spray or pour cleaning liquids directly onto the PTC.

### Equipment required:

- A soft, lint-free cloth
- A nonabrasive liquid cleaner such as Windex®

To clean the PTC-960L, slightly moisten a soft, clean, lint-free cloth with a mild nonabrasive cleaner and wipe the outside surfaces. Do not use a paper towel.

If the PTC-960L becomes extremely dirty or if liquids, dirt, or other foreign materials get inside the case, contact your Telxon service representative.

## **Servicing the PTC-960L**

Do not attempt to service the PTC. Only a trained Telxon technician may service the PTC. Follow the procedures set up by your organization to have the PTC serviced properly.

# Replacing the battery 11

! Once you remove the PTC's battery, the backup battery will protect stored programs and data for approximately 20 minutes. After that, all programs and data will be lost.

Use the procedures in this chapter to remove a weak nickel-cadmium battery pack or alkaline battery from the PTC-960L and replace it with a new one. The Low Battery icon appears on the PTC's display when the battery is running out of power.

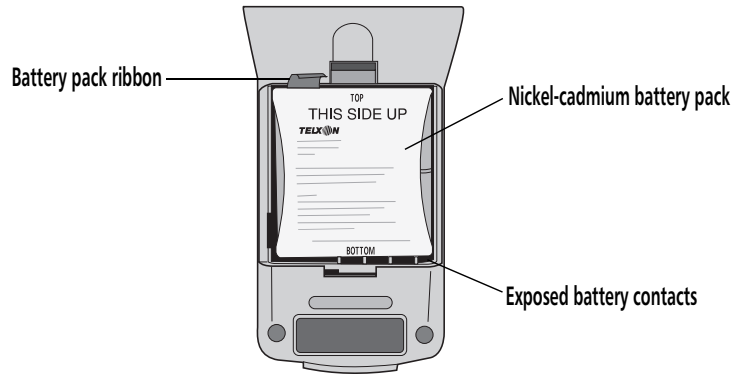
## Replacing the nickel-cadmium battery pack

### Removing the battery pack

1. Turn off the PTC.
2. Lay the PTC facedown on a flat surface.
3. If a handstrap is attached to the PTC, turn the triangle on the bottom of the strap approximately 45° clockwise until you can remove it from the handstrap bracket.
4. Insert your fingernail into the slot at the top of the battery door and pull back, causing the door to lift up. Remove the door from the unit.
5. Pull on the exposed ribbon (see **Figure 5**) to lift the battery pack out of the compartment.
6. Refer to **page 9** for instructions on properly disposing of your nickel-cadmium battery pack.



Figure 5. Replacing a nickel-cadmium battery pack



### Installing a new battery pack

1. Hold the new battery pack over the battery compartment, making sure the Telxon label is facing you and the exposed battery contacts are facing down. See Figure 5.
2. Insert the bottom end of the battery pack (with the exposed contacts) into the compartment first and then lower the opposite end.
3. Replace the battery door.

### Replacing the alkaline battery

A 9-volt alkaline battery may be used in the PTC-960L, but for optimal performance, Telxon recommends using a rechargeable nickel-cadmium battery pack.

If your PTC contains a 9-volt alkaline battery, it is held in place by a foam block and connected to the PTC via a 9-volt battery cable.

### Removing the alkaline battery

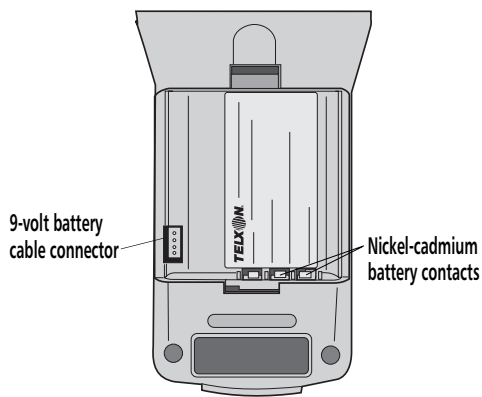
1. Follow Steps 1 through 4 under “Removing the battery pack” on [page 30](#).
2. Remove the battery from the foam block; then unsnap the battery cable.

### Installing a new alkaline battery

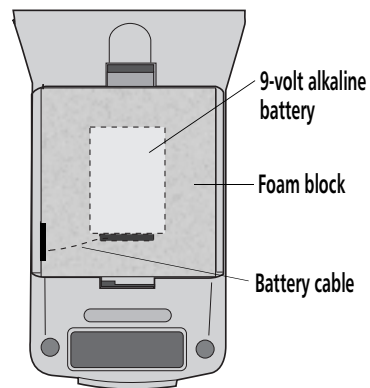
! Use the alkaline battery only when the foam block is installed; otherwise, the battery case may short out the nickel-cadmium battery contacts. See Figure 6.

1. Snap the battery cable onto the replacement battery.
2. Insert the foam block into the battery compartment, if it is not already installed.
3. Place the battery into the opening in the foam block.
4. Replace the battery door.

Figure 6. Installing a new alkaline battery



View of empty battery compartment



View of battery compartment with alkaline battery installed, connected to 9-volt battery cable connector, and held in place by foam block

# Troubleshooting 12

If you experience any of the following problems, follow the instructions provided.

## The PTC does not turn on

- Charge the nickel-cadmium battery pack or replace the alkaline battery.
- Contact your Telxon service representative.

## The laser scanner does not read a label

- Make sure the bar-code label you are trying to scan is one of the bar-code types your PTC has been programmed to recognize.
- Move the PTC-960L closer to or farther away from the bar-code label. You may not be scanning at the correct distance.
- Change the angle of the laser scanner to the bar-code label. You may be too far above or below the bar-code label or too far to the side to scan properly.
- Clean the scanner lens.
- Point the scanner at a blank surface and press the Scan button. Look for the scanning line that appears on the blank surface when the scanner is operating. If no scanning line appears, follow your organization's procedure to have the PTC serviced.

## Other problems

If you experience any other problems with your PTC-960L that you cannot solve, notify your Telxon service representative or contact the Telxon Customer Support Center at 1-800-800-8010.

# Appendix A

## Specifications

### Display screen

Type:	FTSN LCD
Size:	8 lines by 21 characters
Screen icons:	Shift Mode Enabled, Caps Lock Enabled, Func1 Is Activated, Func2 Is Activated, RF Out of Range, Low Battery
Resolution:	128 x 64 graphic pixels

### Electrical

Battery power:	7.2-volt, 500-mAh rechargeable nickel-cadmium battery pack (standard); 9-volt alkaline battery (optional)
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### Environmental

Operating temperature:	0 to 120 degrees F (-18 to 49 degrees C)
Storage temperature:	-20 to 140 degrees F (-29 to 60 degrees C)
Humidity:	95% noncondensing
Electrostatic discharge:	15-kV shock causes no damage; 8-kV shock causes no lock-up or data loss

## Memory

RAM:	128 KB, expandable to 1 MB
ROM:	256-KB OS flash EPROM 256-KB application flash EPROM

## Physical

Length:	8.25 in/21 cm
Width:	3.13 in/8 cm (at the display) 2.5 in/6.4 cm (at the keyboard)
Depth:	1.88 in/4.78 cm (at the display) 1.4 in/3.56 cm (at the keyboard)
Weight:	16.4 oz/.47 kg (with alkaline battery) 17.9 oz/.51 kg (with battery pack)

## Processor

Microprocessor:	V20H/80C88
Processing speed:	10 MHz (terminal processing)

# Appendix B

## Bar-code types supported

Other bar-code types may be available. Contact your Telxon representative for more information.

The PTC-960L can be programmed to read and automatically discriminate between up to ten of the following bar-code types. See the information provided by your organization for the specific bar-code types your PTC-960L is programmed to read.

- UPC
- EAN
- Plessey
- Code 39
- Code 93
- Code 11
- Code 2 of 5 - Straight, Interleaved, and Industrial
- Codabar
- Code 128
- Ames

# Appendix C

## Accessory part numbers

Table 1 contains part numbers for ordering PTC-960L accessory hardware.

Table 1. Accessory part numbers

Item	Part number
<b>Accessories</b>	
9-volt alkaline battery	11695-000
Alkaline battery cable	20212-001
Alkaline battery foam block	20815-000
Battery charger (AC adapter with DB-15)	20210-001
Handstrap	19656-001
Nickel-cadmium battery pack	20198-101
SC-960L Single-bay Communication Cradle	20520-003
<b>Cables</b>	
Pigtail (12") micro DB-15-to-DB-25 adapter cable (with charging jack)**	20955-002
Pigtail (12") micro DB-15-to-DB-25 adapter cable (w/o charging jack)	21019-001
Micro DB-15-to-DB-9 adapter cable (6')	21146-000
Clone cable	21018-001
PTC-to-1/2 duplex modem cable*	10124-0X1
PTC-to-full duplex modem cable*	10124-0X2
PTC-to-host (DTE) cable*	10124-0X3
PTC-to-IBM PC/AT download cable*	
3 ft/.91 m	13656-313
6 ft/1.8 m	13656-323
10 ft/3.05 m	13656-333
PTC-to-IBM PC/XT download cable*	
6 ft/1.8 m (female)	10582-000
6 ft/1.8 m (male)	10582-110

\* These cables must be used with pigtail communication cable 20955-002 or 21019-001.

\*\* Use this cable with AC wall adapter 12176-000 or 10142-200.



Item	Part number
<b>Manuals</b>	
<i>Guide to Maintaining NiCd Batteries</i>	16488-000
<i>Guide to the Flash Utilities (TCAL or MS-DOS Version)</i>	16541-000
<i>SC-960RL/SC-960L User's Guide</i>	21570-000

# Appendix D

## Communication connections

This chapter provides information on the connections used to establish and maintain communication between the PTC-960L and other devices.

Table 2 lists the pinouts for the PTC-960L's micro DB-15 connector. All I/O lines are directional and support RS-232 voltage levels.

Figures 7 through 15 illustrate the configurations for cables that can connect the PTC-960L to other devices.

Table 2. Micro DB-15 connector pinouts

Pin #	Signal	Description	Direction
1	Open	N.C.	
2	TXD	Transmit data	Output
3	RXD	Receive data	Input
4	RTS	Request to send	Output
5	CTS	Clear to send	Input
6	DSR	Data set ready	Output
7	GND	Ground	
8	CD	Carrier detect	Input
9	DTR	Data terminal ready	Output
10	RING	Ring indicate	Input
11	DS0	Device select zero	Output
12	Open	N.C.	
13	Open	N.C.	
14	VCC	Switched power +5 volts	Output
15	VCHG	Battery charge	Input

**Figure 7. Pigtail micro DB-15-to-DB-25 adapter cable (w/ charging jack), P/N 20955-002**

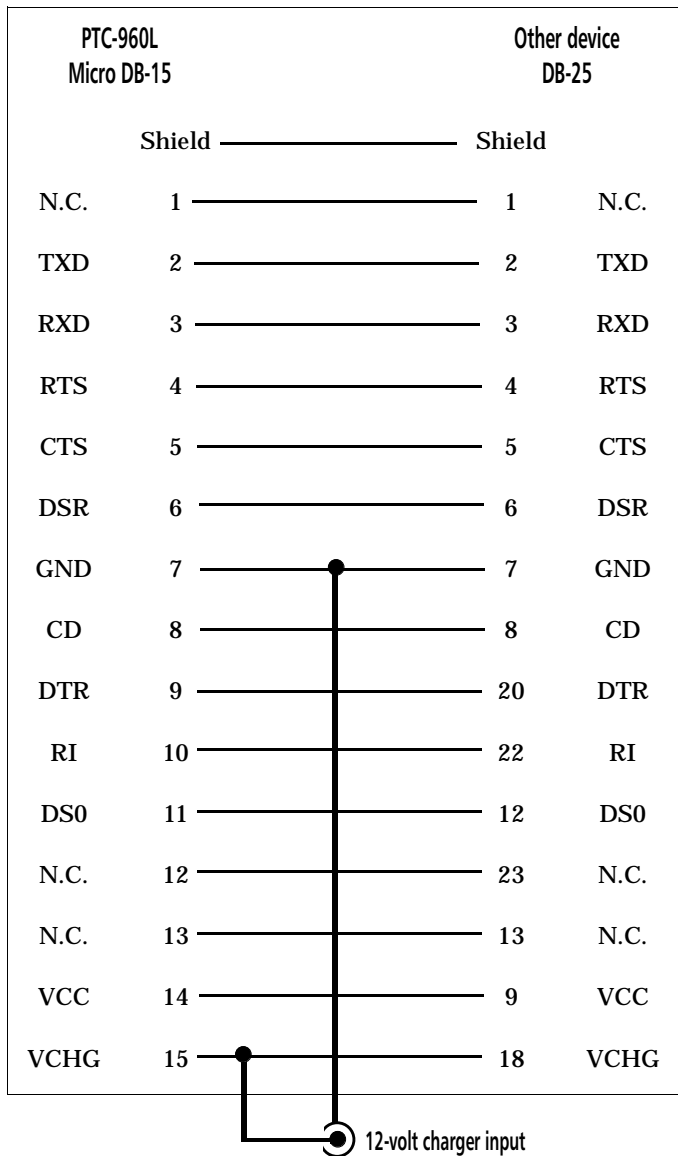


Figure 8. Pigtail micro DB-15-to-DB-25 adapter cable (w/o charging jack),  
P/N 21019-001

PTC-960L				Other device	
Micro DB-15				DB-25	
VCHG	15	—————	18	VCHG	
DTR	9	—————	20	DTR	
TXD	2	—————	2	TXD	
CTS	5	—————	5	CTS	
RING	10	—————	22	RING	
DSR	6	—————	6	DSR	
RTS	4	—————	4	RTS	
RXD	3	—————	3	RXD	
GND	7	—————	7	GND	
N.C.	1	—————	1	N.C.	
CD	8	—————	8	CD	
DS0	11	—————	12	DS0	
N.C.	12	—————	23	N.C.	
N.C.	13	—————	13	N.C.	
VCC	14	—————	9	VCC	
		Shield —————	Shield		

Figure 9. Micro DB-15-to-DB-9 adapter cable, P/N 21146-000

PTC-960L Micro DB-15			IBM PC/AT DB-9		
DTR	9	—————	6		DSR
TXD	2	—————	2		RXD
DSR	6	—————	4		DTR
CTS	5	—————	7		RTS
RTS	4	—————	8		CTS
RXD	3	—————	3		TXD
GND	7	—————	5		GND
Shield			—————	Shield	

Figure 10. Clone cable, P/N 21018-001

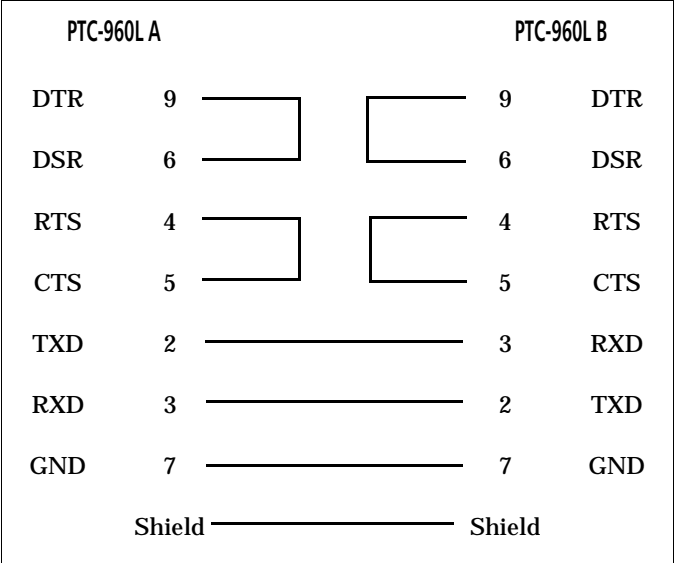


Figure 11. PTC-to-1/2 duplex modem cable, P/N 10124-0X1

PTC-960L		Modem/Type I (1/2 Duplex)	
TXD	2	2	TXD
RCV	3	3	RCV
DSR	6	6	DSR
DTR	20	20	DTR
RTS	4	4	RTS
CTS	5	5	CTS
RI	22	22	RI
CD	8	8	CD
SG	7	7	SG
-5 VDC	10		
OUT	11		

Figure 12. PTC-to-full duplex modem cable, P/N 10124-0X2

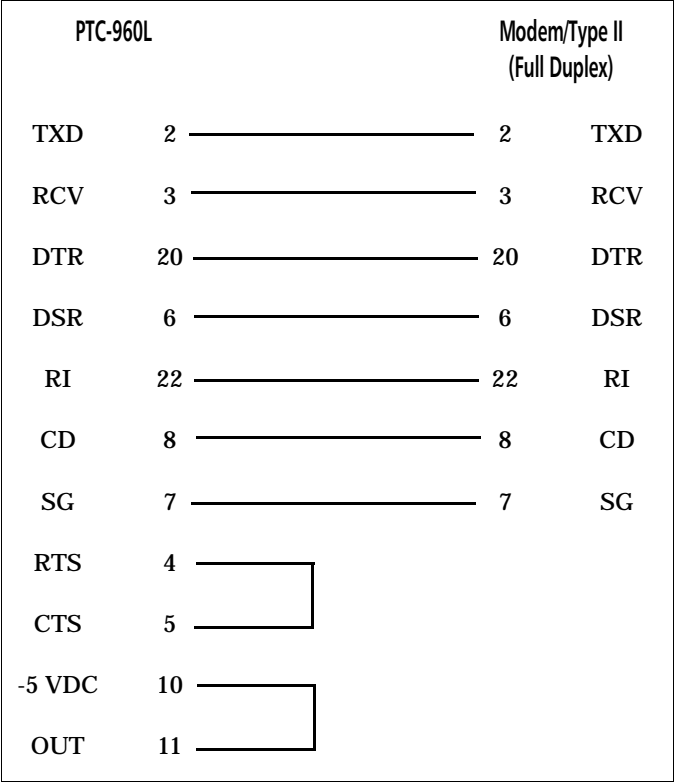




Figure 13. PTC-to-host (DTE) cable, P/N 10124-0X3

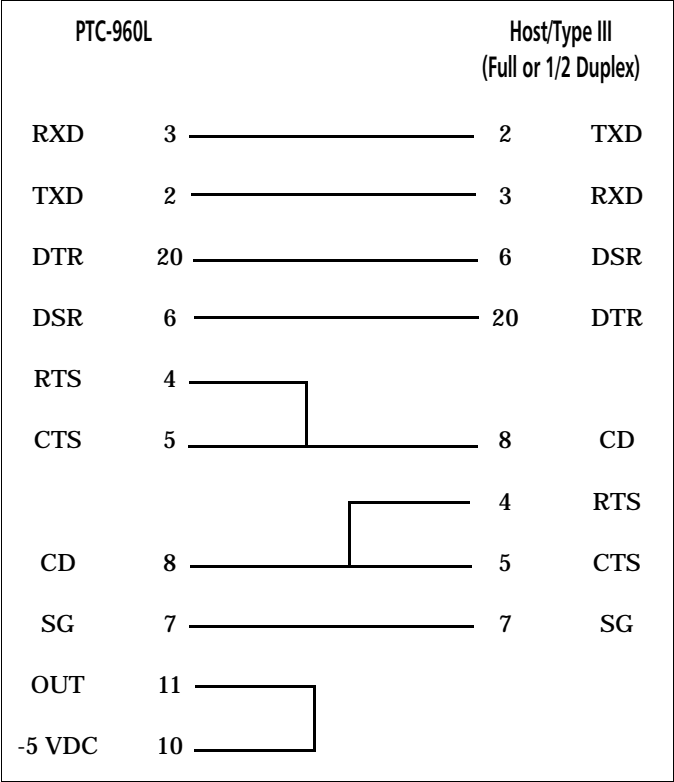


Figure 14. PTC-to-IBM PC/AT download cable, P/N 13656-3X3

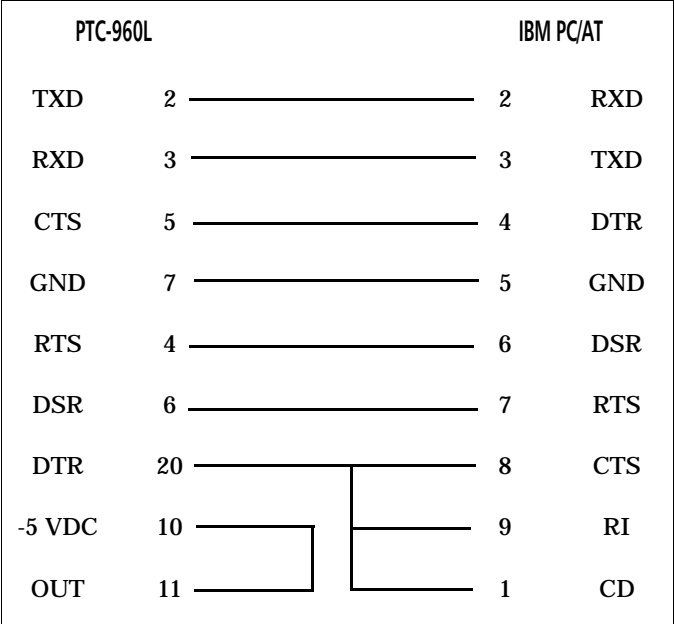


Figure 15. PTC-to-IBM PC/XT download cable, P/N 10582-XX0

PTC-960L		IBM PC/XT Female (000)/Male (110)	
TXD	2	3	RXD
RXD	3	2	TXD
RTS	4	6	DSR
CTS	5	20	DTR
DSR	6	4	RTS
GND	7	7	GND
DTR	20	5	CTS
-5 VDC	10		
OUT	11		

# Glossary

application	A PTC program that is designed to perform a specific task for the user. Examples include route accounting, payroll, price lookup, shipping, and inventory control.
bar code	A series of vertical bars and spaces used to encode numeric or alphanumeric information. Bar codes are designed to be read by electronic means such as bar-code readers or laser scanners.
byte	A group of eight bits that acts as a basic unit for information transfer and storage.
CD	Carrier detect signal. CD indicates that the modem is receiving a signal from the remote modem.
character	A letter, number, or symbol.
CTS	Clear-to-send signal. CTS indicates that the line between a modem and a terminal device is clear for transmission. CTS typically follows a raised request-to-send (RTS) signal.
data communication	The transport of encoded information from one point to another.
DCE	Data communications equipment. A device that controls and converts incoming data or communication. For example, a modem.
display	The screen on the front of the PTC. It is used to show data entered into the PTC and warning prompts.
DSR	Data set ready signal. The modem sends DSR to the attached device to indicate that the modem is connected, on, and ready.

DTE	Data terminal equipment. A device comprising the data source. For example, the host computer.
DTR	Data terminal ready signal. The signal sent by the terminal device to the modem to indicate that the terminal is ready for transmission.
ESD	Electrostatic discharge.
file	Any group or collection of related information stored in memory. To add data to a file or to read data from a file, the program must access the file by its file name.
flash EPROM	A type of erasable programmable read-only memory that can be erased and reprogrammed electronically while installed in a PTC.
function key	A key on the PTC's keyboard that is defined by an application to perform a specific task. When pressed, a function key executes a certain function (for example, ENTER, END, ON/OFF).
GND	Ground.
hardware	Equipment used in conjunction with programs or data communication. Contrast with <i>software</i> .
host computer	A personal computer or mainframe that receives and processes data from PTCs.
interface	The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings.
I/O port	Input/output port. The location on a PTC where RS-232-compatible accessories are attached. Also, the point through which the PTC sends and receives transmission signals.
keyboard overlay	The plastic label that lies on top of the PTC keyboard, identifying the function key definitions.
laser scanner	A type of bar-code reader that uses a beam of laser light.

LCD	Liquid crystal display.
LED	Light-emitting diode.
mAh	Milliampere hour(s). A measurement of the ability to provide electrical power.
modem	Modulator-demodulator. A communication device that converts serial digital data from a transmitting device to a signal suitable for transmission over a telephone line and then reconverts the signal to serial digital data for the receiving device.
MS-DOS	Microsoft Disk Operating System.
one-way communication	Transport of information from one device to another without interruption. In one-way communication, the receiving device cannot respond directly to the sending device.
prompt	Messages shown by the PTC that guide the operator through the steps of the application program. Prompts are different for different programs.
PTC	Portable Tele-Transaction Computer. A programmable device used to collect, store, and transmit data.
RAM	Random access memory. In a PTC, RAM chips store the program files and data entered by the operator.
RF	Radio frequency.
RI	Ring indicate signal. RI alerts a modem to a call waiting on the attached telephone line.
ROM	Read-only memory. In a PTC, ROM chips contain the operating system and the application program.
RS-232	An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

RTS	Request-to-send signal. RTS initiates the data transmission sequence on a communication line between a modem and a terminal device.
RXD	Receive data signal. RXD indicates that a device is currently receiving data.
signals	Electronic impulses that transmit data from one device to another.
software	A stored program or set of programs that is loaded into RAM for execution. Contrast with <i>hardware</i> .
TCAL	Telxon Common Application Language. Telxon's proprietary programming language for PTCs.
two-way communication	Exchange of information between two devices. After each block of data, the receiving device sends a positive or negative acknowledgment to the sending device.
TXD	Transmit data signal. TXD indicates that a device is currently transmitting data.
VDC	Volts direct current. A unit of measure of electric potential or potential difference in a unidirectional current.

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